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Water Quality

With a growing population of more than 30 million and a limited supply of fresh water, the protection of water for beneficial uses is of paramount concern for all Californians. The State Water Board and the nine Regional Water Boards, under the umbrella of the California Environmental Protection Agency, are responsible for protecting California's water resources. The Department of Public Health is responsible for protecting drinking water quality. Significant discussion of the major water quality issues and initiatives are included in the 12 regional reports of Volume 3. See further discussion under Contamination of Surface Water and Groundwater under Critical Challenges.

Since the passage of the federal Clean Water Act in 1972, California has made great strides in cleaning up its rivers, lakes, groundwater aquifers, and coastal waters. The primary focus of that effort, both in California and nationally, has been on wastewater discharged from "point sources," for example, sewer outfalls and other easily identifiable sources such as pipes. An even greater challenge is pollution resulting from "nonpoint sources," for example, runoff and drainage from urban areas, agriculture, timber operations, mine drainage, and other sources for which there is no single point of discharge. Nonpoint source pollution is the most significant California water quality challenge today and requires flexible and creative responses. Although water quality issues can be essentially divided into the two categories—point and nonpoint sources—specific constituents and circumstances vary from region to region as can be seen in reading each regional report.

Drought periods underscore the inseparability of water supply and water quality. Overpumping groundwater basins to augment water supplies reduces long-term available water supply, increases pumping costs, and in some areas, like along the coast, degrades groundwater quality. In many areas surface water and groundwater are impaired by natural and human-made contaminants that can threaten human health, degrade the natural environment, increase water treatment costs, and effectively reduce the available water supply.

By law, water quality basin plans prepared by the State and Regional Water Boards when approved become part of the California Water Plan. In the future, those basin plans along with other water quality reports will be integrated regionally into the water portfolios. (See Table 4-3 Basin Plan adoption dates.)

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Contamination of Surface Water and Groundwater

Water bodies may be impaired from various sources. For example, discharges from municipal and industrial facilities can impact water bodies. But compared to other sources, pollution from these point source discharges has been largely controlled. Discharges from agricultural lands, including irrigation return flow, flows from tile drains, and storm water runoff, can affect water quality by transporting pollutants, including pesticides, sediment, nutrients, salts, pathogens, and heavy metals, from cultivated fields into surface waters. Groundwater, in turn, has been affected by pesticide, nitrate, and salt contamination. Storm water flows over urban landscapes, as well as dry-weather flows from urban areas, also constitute a significant source of pollutants that contribute to water quality degradation in the state. These flows carry pollutants downstream, which often end up on the beaches and in coastal waters.

Changes in temperature and precipitation patterns caused by climate change will affect water quality. Higher water temperatures reduce dissolved oxygen levels, which can have an adverse effect on aquatic life. Where river and lake levels fall, pollutant concentrations will increase. Increased frequency and intensity of rainfall will produce more pollution and sedimentation due to runoff. In addition, more frequent and intense rainfall may overwhelm pollution control facilities that have been designed to handle sewage and storm water runoff under assumptions anchored in historical rainfall patterns.

Changes in the timing of river flows may affect water quality and beneficial uses in many different ways. At one extreme, flood peaks may cause more erosion, resulting in higher turbidity and concentrated pulses of pathogens, nutrients, and other pollutants. This will challenge water treatment plant operations to produce safe drinking water. Increased sediment loads associated with higher intensity flooding can also threaten the integrity of water works infrastructure, including more rapid buildup of sediments reservoir, and deposition of debris and sediments in canals and intakes. At the other extreme, lower summer and fall flows may provide less dilution of contaminants. These changes in streamflow timing may require new approaches to manage discharge permitting and nonpoint source pollution. Warmer water will distress many fish species and could require additional cold water reservoir releases. Higher water temperatures will also accelerate certain biological and chemical processes, increasing the growth of algae and microorganisms and the depletion of dissolved oxygen, and worsen the various impacts to water treatment processes. An increase in the frequency and intensity of wildfires will also have a deleterious effect on watersheds, vegetation, runoff, and, in the end, water quality.